



Methane leakage from natural gas operations

HOW IT HAPPENS AND WHAT CAN BE DONE ABOUT IT

Our new paper, published in the Proceedings of the National Academy of Sciences (PNAS), discusses the climate implications of methane leakage from the natural gas industry. This backgrounder describes how emissions occur and how they can be reduced.

Where do the methane emissions come from?

Emissions result from leaks and routine venting during the production, processing and transportation of natural gas, which is predominantly composed of methane. There are numerous individual components used throughout natural gas systems that are prone to leaks, including compressors, valves, pumps, flanges, gauges and pipe connectors, among others. In addition to unintentional leaks, a number of sources intentionally vent gas. One example is pneumatic valves, used throughout natural gas systems, which operate on pressurized natural gas and bleed small quantities of natural gas by design during normal operation. Additionally, gas is often vented from storage tanks, dehydrators, depressurizing equipment before maintenance and wells after hydraulic fracturing or when liquids are removed.



61% Natural gas production

Chesapeake



8% Processing

DCP Midstream



19% Transmission and storage

TransCanada



13% Local distribution

W.L. Sunshine

Other air pollutants from natural gas operations

Leaks and venting at natural gas well sites and processing plants release other pollutants besides methane that can threaten air quality and public health (e.g., benzene, hexane, hydrogen sulfide). The air quality impacts of these emissions vary based on local conditions, but they can be important, especially in rural areas. For example, wintertime ozone levels in excess of the nation's health-based air quality standards have been recorded in parts of Wyoming and Utah, where natural gas and oil production are the only significant industrial activities. Engines and other combustion sources used throughout the industry also produce emissions that can affect air quality.

How can methane emissions be reduced?

Proven, cost-effective technologies exist to reduce routine and non-routine emissions of methane during oil and gas exploration and production. The U.S. Environmental Protection Agency (EPA), in conjunction with the natural gas and oil industry, has developed and tested more than 100 ways to reduce methane emissions while increasing revenues by keeping more product in the pipeline¹. The U.S. Government Accountability Office (GAO) estimates that around 40% of natural gas estimated to be vented and flared on onshore federal leases could be economically captured with currently available control technologies². EPA has proposed new standards requiring the capture of gas during well completions and from tanks, use of low-bleed pneumatics and reductions from compressor engines. If adopted, these would be a good start, but they fail to address methane emissions directly, exclude common sources of emissions, such as well unloading, and require only limited improvements at existing wells.

1 <http://www.epa.gov/gasstar/>

2 <http://www.gao.gov/products/GAO-11-34>

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